

Tsuneo NAMBA* & Tadato TANI*: **Pharmacognostical studies
on the Tibetan herbal medicines (4)****
On “Khaunjun”

難波恒雄*・谿 忠人*: チベット薬物の生薬学的研究 (4)**
“Khaunjun” について

In the first paper¹⁾ of this series attention has been drawn to the original species of Tibetan medicines and to the relations between the direction in the Tibetan medicine and those in the Indian and Chinese medicine. This paper deals with the morphological characters of “Khaunjun”, which has been used as an antitussive in the Tibetan medicine. From the results of this studies the crude drug, “Khaunjun”, seemed to be the entire plant of *Gentiana* species in Sect. *Pneumonanthe*.²⁾

Material The crude drug (T. 14) used by Mr. Chamba Innye, Tibetan doctor, collected by T. Namba in Oct. 30, 1963 at Sama Village in Central Nepal.

External structures (Fig. 1, A, B₁₋₄, C₁) The crude drugs are terrestrial organs of plant with flowers. They have no odour and bitter taste.

Stems are 2 to 6 cm long and 0.5 to 2 mm in diameter. They are branched and yellowish brown. Cauline leaves are 6 to 13 mm long and 2 to 5 mm broad. They are opposite, sessile, pandurate and emarginate. The upper part of lamina is exceedingly fleshy. Flowers are terminal, sessile, solitary and blue. Calyx is 5-merous, 8 to 15 mm long and 3 to 6 mm broad. Sepals are pandulate and emarginate. The upper part of the sepals shows fairly reticular venation, but at the base the midrib and lateral veins are prominent. Corolla is 5-merous, 12 to 20 mm long and often nearly twice as long as the calyx. It is tubular, obtuse and with plicae between the lobes. Capsule is 8 to 12 mm long, ellipsoidal and exserted. Stalk is 3 to 6 mm long. Seed is 1.5 to 2 mm long and ellipsoidal. Testa is faintly reticulated.

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Internal structures in the transverse sections

(Leaf) (Fig. 1, C₁₋₄) The upper epidermis of the lamina consists of a single layer of polygonal and tabular cells. The outer periclinal walls of the cells are thickened, especially at the margin (Fig. 1, C₃), which are covered with a thick, faintly striated cuticle. The cells are 10 to 15 μ long and 45 to 65 μ wide.

The mesophyll is differentiated into slightly thick-walled cells and spongy regions. The parenchyma beneath the upper and lower epidermis consists of one to two rows of cylindrical cells. The spongy mesophyll consists of six to ten rows of circular and thin-walled parenchymatous cells between which lateral veins and veinlets are present. They consist of spirally-thickened vessels. There are not so many sieve tubes around vessels.

The lower epidermis consists of a single layer of polygonal, tabular cells, whose outer periclinal walls are thick as those of the upper epidermis. Oily cell contents may be found in the epidermal cells. Numerous cruciferous stomata are present. They are slightly concave from the level of the epidermal cells.

At the margin, zone of sclerenchyma occurs between each epidermis. These sclerenchymatous cells are rounded and 30 to 50 μ in diameter. They have highly refractive walls which may be slightly suberised.

At the basal part of the leaf (Fig. 1, C₄), the epidermis above the midrib consists of small, tabular cells. The cell walls are slightly thickened and covered with a thinner cuticle which has a faintly striated surface. The mesophyll is not clearly differentiated. The palisade consists of a single layer of cylindrical cells, somewhat discontinuous. The vascular strands are embedded in the spongy mesophyll. There is a phloem region surrounding xylem. The xylem consists of slightly lignified vessels which may be spirally- or annularly-thickened. The lower epidermis is smaller than the upper one.

(Stem) (Fig. 1, D₁₋₃) The transverse sections of the stem are orbicular (Fig. 1, D₁).

The epidermis consists of a single layer of rectangular to oblong cells containing oily and resinous substances. They measure 15 to 20 μ long and 35 to 55 μ wide, of which outer periclinal walls are thickened and covered with a thick cuticle whose surface is striated (Fig. 1, D₃). Three to six layers of thick-walled parenchymatous cells lie beneath the epidermis. Oily

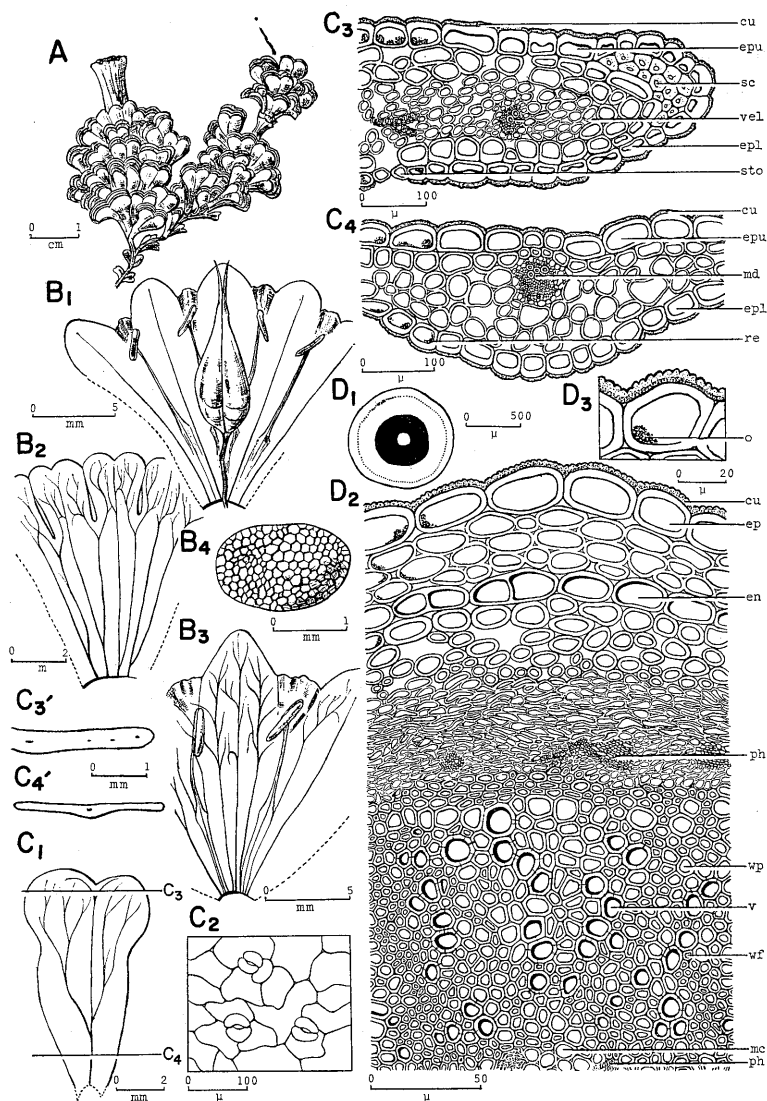


Fig. 1. A: "Khaunjun", B₁: Flower, B₂: Calyx, (errata: m→mm), B₃: Corolla, B₄: Seed, C: Leaf. C₁: Lamina, C₂: Stomata in the lower epidermis, C₃: Detailed drawing of the upper part, C_{3'}: Diagram of the upper part, C₄: Detailed drawing of the lower part, C_{4'}: Diagram of the lower part, D: Stem, D₁: Diagram, D₂: Detailed drawing, D₃: Details of cuticle. Abbreviations in Fig. 1. cu: cuticle, en: endodermis, epl: lower epidermis, epu: upper epidermis, mc: pith parenchyma, md: midrib, o: oil, ph: phloem, re: resin, sc: sclerenchyma, sto: stomata, v: vessel, vel: vienlet, wf: wood fiber, wp: wood parenchyma.

and resinous cell contents may also be present.

The endodermis is often easily recognized and consists of a single row of oblong cells measuring 10 to 15 μ long and 30 to 50 μ wide. The cell walls are slightly suberised and lignified mainly in the region of the middle lamella. At the basal stem the endodermal cells may be divided into several cells. The parenchyma of the secondary cortex consists of two types of cells, either two to four layers of slightly thick-walled cells, or smaller and more thin-walled cells. The latter are surrounding the xylem and consisting of an almost continuous band, in which phloem is embedded.

The xylem consists of somewhat radial rows of vessels, either solitary or in small groups. They are composed of scalariform, pitted and reticulate vessels, which are 10 to 15 μ in diameter. There are some lignified wood fibers and slightly lignified wood parenchyma together with vessels.

The central pith is small, up to 150 μ in diameter and comprises in its periphery internal phloem. The parenchymatous cells of the pith are thin-walled and rounded.

Discussion

1) "Khaunjun" is identical with the descriptions of *Gentiana amoena* Clarke³⁾ and the herbarium specimen of *Gentiana emodi* Marq. (syn. *G. amoena* Clarke⁴⁾) in University of Tokyo. And it is ascertained that the Tibetan crude drug, "Khaunjun" originates from *Gentiana amoena* Clarke.

2) As previously reported,¹⁾ it seems to be the unique direction in Tibet that the entire plants of such small *Gentiana* species as *G. amoena* Clarke, *G. depressa* Don (Sect. *Pneumonanthe*) and *G. detonsa* Fries var. *stracheyi* Clarke (Sect. *Kurroo*) have been used as an antitussive. And numerous small *Gentiana* species may have been applied to the medical purposes as a folk remedy in Tibet and the surrounding regions.

3) In the histological characters, the presence of the daughter cells of the endodermis and the perimedullary phloem groups of the stem is typical of the plants of *Gentianaceae*. Other outstanding characters of this plant, already described and figured, are the presence of the sclerenchyma in the region of the margin of the upper part of the leaf and the striated cuticle deposited on the outer periclinal walls of the epidermal cells of the leaf and stem.

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“Khaunjun” は、チベット医学で鎮咳薬として用いられてきた全草類生薬である。この組織学的特徴を誌し、さらに植物標本および文献記載と比較検討した結果、“Khaunjun” の基源植物は、*Gentiana amoena* Clarke (syn. *G. emodi* Marq.) であると確定し得た。

ヨーロッパにおいても、インドや中国医学においても、リンドウ属は、その地下部を苦味健胃薬、解熱薬、消炎薬に用いられるのが一般的な薬物用法である。チベットの民族医学において、小型のリンドウ属植物の全草を鎮咳薬として用いているのは、甚だ特異的な用法であり、“Khaunjun” は、チベット医学で独自に発達した薬物の一つであろう。チベットでは、このほか Sect. *Pneumonanthe* や Sect. *Kurroo* に属する小型のリンドウ属植物の全草も同様の薬効を期待して用いられている。それゆえ、このような比較的小型のリンドウ属植物は、チベットおよびその周辺地域で広く民間的にも薬用にされていると考えられる。

○新帰化植物ヒメギンネム (山崎 敬) Takasi YAMAZAKI: A new naturalized plant, *Desmanthus virgatus*.

1963 年琉球、首里の林業試験場の構内で、白い花のさくギンネムを貧弱にしたような帰化植物を採集した。調べたところ、南アメリカ原産で東南アジアにも広く野生化している *Desmanthus virgatus* (L.) Willd. であることがわかった。昨年小笠原の父島で、この植物がギンネムの林の縁に群生しているのをみつけた。戦前には知られていなかったものである。*Desmanthus* はアメリカとマダガスカルに 40 種ほど知られる属である。日本にはもう一種帰化していて、多和田真淳氏が琉球嘉手納で 1965 年採集し、大橋広好氏によって *Desmanthus brachylobus* Benthams と同定されている。

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